

## CLAIMS

1. A rotating electrical machine that has a rotor with a body made of magnetic materials, a stator surrounding the rotor; the stator has at least one armature coil, and the rotor has closed notches in the body and devices to selectively establish closed magnetic circuits passing around the armature coil of the stator; these devices include:
  - permanent excitation magnets (20, 24, 26, 30, 40, 46) able to generate magnetic fluxes;
  - excitation coils (22, 28, 42, 44, 48, 50) housed in the notches of the rotor to define coiled poles; said coils are able to be excited and generate magnetic flux components to counter the fluxes generated by at least some of the magnets to create defluxing;
  - characterized by the fact that the number  $N_a$  of magnets and the number  $N_b$  of excitation coils and the arrangement of the coils and magnets in relation to each other form an elementary pattern (me); this elementary pattern can be repeated a number  $N_{me}$  of times.
2. Rotating electrical machine according to claim 1, characterized by the fact that  $N_a$  is equal to or greater than 1,  $N_b$  is equal to or greater than 1,  $N_{me}$  is equal to or greater than 1, and the pair  $N_a, N_b$  is different than 1.1.
3. Rotating electrical machine according to claim 1, characterized by the fact that the magnets  $N_a$  of the same elementary pattern are arranged to generate a radial magnetic flux.
4. Rotating electrical machine according to claim 3, characterized by the fact that the magnets in the same elementary pattern have the same polarity.
5. Rotating electrical machine according to claim 1, characterized by the fact that the coil poles in the same elementary pattern have the same polarity.
6. Rotating electrical machine according to claim 1, characterized by the fact that it has, within an elementary pattern, at least two consecutive magnets separated by at least one reluctance pole.

7. Rotating electrical machine according to claim 1, characterized by the fact that it has, within an elementary pattern, at least two consecutive coil poles separated by at least one reluctance pole.
8. Rotating electrical machine according to claim 1, characterized by the fact that it has, within an elementary pattern, at least one coil pole and a consecutive magnet separated by at least one reluctance pole
9. Rotating electrical machine according to claim 1, characterized by the fact that the winding strands of a coil belonging to an elementary pattern are held in two adjacent notches placed between two consecutive magnets.
10. Rotating electrical machine according to claim 1, characterized by the fact that several elementary patterns are associated with each other.
11. Rotating electrical machine according to claim 10, characterized by the fact that the elementary patterns are different.
12. Rotating electrical machine according to claim 10, characterized by the fact that it has, between at least two consecutive elementary patterns, a succession of at least one pair of North-South or South-North poles created by at least one magnet.
13. Rotating electrical machine according to claim 12, characterized by the fact that at least one magnet inserted between two consecutive elementary patterns has a different polarity from at least one magnet belonging to at least one elementary pattern.
14. Rotating electrical machine according to claim 1, characterized by the fact that the Nb coils are not all excited simultaneously
15. Rotating electrical machine according to claim 1, characterized by the fact that the intensity of modulation ( $I_{mod}$ ) is in an interval between  $-I_b$  and  $+I_b$ , where  $I_b$  is the maximum intensity of the magnetic flux supplied by the Nb coils.

16. Rotating electrical machine according to claim 1, characterized by the fact that there is a residual magnetic flux ( $F_r$ ) coming from the magnets which is not subject to the influence of the defluxing magnetic flux ( $F_d$ ) produced by the excitation coils.
17. Rotating electrical machine according to claim 1, characterized by the fact that it consists of an automobile alternator.
18. Rotating electrical machine according to claim 1, characterized by the fact that it consists of an automobile alternator-starter.